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Department for Supplying the City with Water.

ANNUAL REPORT

OF THE

Chief Engineer of the Water Works

OF THE

CITY OF PHILADELPHIA.

Presented to Councils, January 22, 1857.

PHILADELPHIA:
PENNSYLVANIAN BOOK AND JOB PRINTING OFFICE,
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......
1857.

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Messenger.
SAMUEL L. SNYDER.

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Department for Supplying the City with Water,
January 15, 1857.

To the Select and Common Councils
of the City of Philadelphia:

Gentlemen:—In compliance with the Ordinance organizing this Department, I respectfully submit the following Report for the year 1856. It embraces, in addition to the statements of its general operations for that period, remarks upon the condition and capacity of the several Water Works, the means adopted to promote their efficiency, and suggestions of improvements which, in my judgment, are necessary to render them equal to the wants of the city in the early future.

FAIRMOUNT WORKS.

These Works have been examined with a care due to their importance, and it has been found that excessive work, and the effects of age, have greatly impaired their condition. Some important parts of the wood work not open to the public view, are so much decayed as to require to be rebuilt. Wheel No. 4 was so much worn, that nothing short of a thorough renewal of all but the iron work could make it reliable. This is in progress now. Several of the other wheels and some of the gates will require minor repairs, all of which are receiving attention. The pumps have been overhauled, and all of them, except No. 4, will be in effective order for the heavy summer work. This one is entirely too light to pump into the new basin.

The Dam was thoroughly inspected in August last, and it was found that the part of the structure where the water in front is deepest, had settled about twelve inches. It was discovered also that the stone filling-in at the foundation had been washed out. All this has been thoroughly repaired. The filling-in has been replaced with heavy stone up to low water mark—the Dam has been substantially made up to its proper level—a new ice-break has been erected in place of the old one, which was rotten from age—and the whole structure is now in excellent order, and in my judgment, perfectly secure.

The basins and grounds required but slight repairs; at a few points gullies and washes were being formed by the water from heavy rains, and were defacing the beauty of the place. These have been filled up and sodded, and their recurrence prevented by the erection of walls of stone. The usual yearly repairs will leave the grounds in fine order, and nothing in the way of improvement can be suggested, but to light them with gas, which, it seems to me, should be done without delay. As the Fairmount Water Works and grounds are objects of just pride with the citizens of Philadelphia, and much visited by strangers in the evening as well as in the day, it is surprising that gas lights have never been introduced. The brilliant lighting of the place at night, besides adding to its beauty, would have the incidental effect to abate some abuses that are well known to exist.

During the month of July, the breast wheels worked an average of sixteen hours and three minutes a day. This is within two hours of their maximum, as for a period of about six hours each day, the running of the breast wheels must be suspended, on account of the tides and low water on the dam. The Turbine wheel, during the same month, averaged twenty-one hours and eighteen minutes per day, which was very nearly all the time it had a supply of water. For several days in July the wheels were

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stopped for three hours at a time, because of the lowness of the water on the dam, and on these days, while there was water sufficient, the pumps were worked to their full capacity, without making any increase in the basins. This is an important fact, and should receive the timely consideration of Councils.

To exhibit how closely the present demands upon the Fairmount Works approach to their full capacity, and to suggest how soon they must prove unequal to the wants of that part of the city which they supply, the following figures are presented:

	Gallons.
The daily capacity of the present wheels and pumps, working eighteen hours, is - - -	12,727,708
The average consumption per day in July, 1856, was	11,445,891
Leaving an excess of capacity beyond the demand, of	1,281,817

As the increase of daily consumption in July, 1856, over July, 1855, amounted to 2,032,674 gallons, it requires but a short calculation to show that this rate of increase will at no distant period tax the power of the Fairmount Works to the utmost.

The Reservoirs of the Fairmount Works, including the new one on Corinthian avenue, furnish storage to the amount of 57,642,787 gallons. This is about equal to five days' supply in July and August.

The following statement exhibits, in tabular form, the amount of duty performed by these Works during the year 1856.

Account of the Consumption of Water, and Operation of the FAIRMOUNT WATER WORKS, *during the year* 1856, *being for the Supply of the* 1st, 2*d*, 3*d*, 4*th*, 5*th*, 6*th*, 7*th*, 8*th*, 9*th and* 10*th Wards of the City.*

NINE WHEELS.

MONTHS.	Total quantity of Water pumped during the year.	Average amount of water pumped per day.	No. of hours the breast wheels worked.	No. of hours each wheel worked per day.	No. of hours the Turbine worked.	Average No. of hours Turbine worked	Average depth of Water over Dam.	Average Rain fall.
	Wine Gallons.	*Wine Gallons.*						*Inches.*
January	160,654,084	5,182,369	2,084½	8.24	53½	1.43	7.48	4.54
February	150,671,649	5,195,574	1,934	8.20	68½	2.21	5.72	1.23
March	171,640,857	5,536,801	2,257	9.06	31	1.	10.19	2.23
April	209,704,200	6,990,646	2,620	10.55	158	5.16	14.50	3.52
May	251,927,209	8,126,684	3,089½	12.27	240½	7.45	9.70	2.59
June	285,506,853	9,516,895	3,538	14.44	240½	8.01	6.63	1.98
July	354,822,648	11,445,891	3,983	16.03	660½	21.18	6.29	1.51
August	290,979,768	9,336,444	3,638	14.40	217	7.	7.64	6.00
September	295,683,070	9,856,102	3,595½	14.58	309	10.18	7.90	4.01
October	305,686,202	9,861,167	3,672	14.48	359	11.34	9.96	1.30
November	236,881,963	7,896,065	2,943	12.15	192½	6.25	6.60	2.07
December	153,030,462	4,936,466	2,627	10.35	261½	8.26	11.41	2.94
Total	2,867,188,965	7,833,849	35,981½	12.17	2791½	7.37	8.73	

The greatest depth of water running over the Dam, was on Tuesday, Aug. 5th, when the depth was two feet six inches.

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SCHUYLKILL WORKS.

The power at the Schuylkill Works is supplied by four steam engines, three of which are known as Engines Nos. 1, 2, 3, and the 4th as the Cornish Engine. Nos. 1 and 2 are expansive condensing engines, with thirty-six inch cylinders, and six feet stroke, cutting off steam at three feet; and each one drives a double acting pump eighteen inches in diameter and six feet stroke, placed in the same vertical line with the steam cylinders, the pistons of the pumps and cylinder moving together. These engines require overhauling and slight repairs, which will place them in order for the coming season. To ensure efficiency to the Works, however, one of the valve-boxes of pump attached to No. 2, which has been cracked for some time, should be replaced by a new one.

No. 3 is an expansive condensing engine with vertical cylinder thirty-six inches in diameter and six feet stroke, cutting off steam at three feet, and connected by a bell crank beam, with a horizontal pump twenty-two and one-half inches in diameter, and four feet stroke. This engine has been recently overhauled and put in good order. Engines Nos. 1, 2, 3, are supplied with steam from the same boilers. These appear to be in perfect condition. The grates and furnaces require some slight repairs. These three Engines are never idle all at the same time, some one being always at work, which arrangement prevents waste of fuel by standing. In testing together the duty of Nos. 1, 2, 3, which it has been remarked are run from the same boilers, I find they have raised 29,557 gallons with 100 lbs. of coal.

Engine No. 4 is a regular beam Cornish Engine, with steam cylinder sixty inches in diameter and ten feet stroke, cutting off steam at seventeen inches, and driving a pump thirty inches in diameter with ten feet stroke.

The operation of this engine had been delayed a long time for want of sufficient foundation and other facilities for erecting it properly, and because when started, it was discovered that it could not be worked without danger of bursting the main with which it was connected, or doing essential damage to the engine itself. This latter cause led to the erection of a stand-pipe at the Schuylkill Works. From the time when the stand-pipe was finished, to July last, when the Department was committed to my charge, the Engine which was at that time being painted, had only been run at intervals for the purpose of trial and adjustment. It was started for permanent duty in August last, and since that period has been worked with successful and satisfactory results. For its duty prior to August, I cannot vouch, as the accounts of the coal it consumed and the pumping it performed were kept in a manner too loose and incorrect to be of value in deciding results. The engineers have since been enjoined to be careful and accurate, and the statements in the table annexed, giving the duty performed by the engine, may be relied on as correct.

The Cornish Engine is run only in the day time, the fires being pushed back at night and covered up. In computing its work, no allowance has been made for this, as all the coal used for covering up the fires at night and starting in the morning, have been charged to the Engine. No allowance has been made for friction.

Steam is used at a pressure of forty pounds.

The duty of the engine calculated and charged as above, shows an average for five months of 40,198 gallons raised 115 feet high through a main 3,250 feet long, for every hundred pounds of coal.

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The buildings attached to these Works, with the exception of some unimportant repairs and repainting, are in good order. The condition of the grounds and reservoirs is also good.

An exhibit of the maximum capacity of the Schuylkill Works—the heaviest demands upon them, in July 1856—and the increase of consumption during the last year over 1855—is presented by the following figures, and may be useful for reference and comparison.

	Gallons.
The maximum capacity of Schuylkill Works per day, working 24 hours, is - - - - - -	12,418,560
The heaviest daily consumption in July, 1856, was -	7,328,077
Leaving an excess of capacity over the daily demand in 1856, of - - - - - - - -	5,090,483

The increase in the daily consumption, from the Schuylkill Works, in July, 1856, over July, 1855, was 1,612,388 gallons.

There is storage in the Reservoirs attached to the Schuylkill Works, equal to 11,963,636 gallons, which, under ordinary circumstances, is not sufficient for two days' supply.

Annexed is a table of the duty performed by these Works during the year 1856.

Account of the Consumption of Water, and the operation of the SCHUYLKILL STEAM WORKS, *during the year* 1856, *being for the Supply of the* 11*th*, 12*th*, 13*th*, 14*th*, 15*th and* 20*th Wards of the City.*

ENGINES NOS. 1, 2 AND 3.

MONTHS.	Total quantity of Water pumped during the year.	Average amount of Water pumped per day.	Total amount of Coal consumed during the year.			Average amount of Coal used per day.			Average No. of hours the engines run per day.	
	Wine Gallons.	*Wine Gallons.*	*Tons.*	*Cwt.*	*qrs.*	*Tons.*	*Cwt.*	*qrs.*	*Hours.*	*Min.*
January	95,991,520	3,096,500	153	18	1	4	19	1	8	18
February	83,455,520	2,877,775	151	6	0	5	4	1	7	15
March	102,055,040	3,292,098	169	7	2	5	9	1	9	3
April	110,956,960	3,698,565	170	11	3	5	13	2	9	52
May	119,535,620	3,868,890	182	1	0	5	17	1	11	36
June	172,528,640	5,750,954	184	13	2	6	3	0	13	33
July	255,092,800	8,228,800	335	8	1	10	16	1	20	1
August	180,917,600	5,836,051	258	4	1	8	6	2	13	42
September	167,465,120	5,582,170	258	17	1	8	12	2	13	20
October	133,631,840	4,310,704	230	7	0	7	8	2	10	41
November	115,540,800	3,851,360	202	14	3	6	15	0	9	22
December	92,438,880	2,981,899	161	12	2	5	4	1	7	34
Totals	1,629,610,340	4,452,487	2,459	2	0	6	14	1	10	39

Average amount of Coal consumed per day, 6 tons 14 cwt. 1 qr.

Account of the Consumption of Water, and Operation of the SCHUYLKILL STEAM WORKS, *during the year* 1856, *being for the Supply of the* 11*th*, 12*th*, 13*th*, 14*th*, 15*th and* 20*th Wards of the City.*

CORNISH ENGINE.

MONTHS.	Total quantity of Water pumped during the year.	Average amount of Water pumped per day.	Total amount of Coal consumed during the year.			No. of strokes the engine made.	No. of hours the engine worked.	Average No. of hours the engine run per day.
	Wine Gallons.	*Wine Gallons.*	*Tons.*	*Cwt.*	*qrs.*			
January	10,374,840	334,672	15	10	2	28,980	69	2.13
February	23,606,520	814,017	35	6	2	65,940	157	5.24
March	7,066,920	227,965	10	11	2	19,740	47	1.30
April	23,456,160	781,872	35	4	1	65,520	156½	5.13
May	22,578,702	728,345	40	12	1	63,069	180½	5.49
June	27,179,002	905,966	40	10	0	75,919	180	6.00
July								
August	37,599,592	1,212,890	50	0	1	105,024	244	7.52
September	41,468,572	1,382,285	51	7	1	115,834	236½	7.53
October	45,337,836	1,462,510	49	16	1	126,642	245½	7.55
November	62,173,860	2,072,462	58	2	1	173,670	340½	11.21
December	50,185,156	1,615,650	53	13	0	140,182	286	9.13
Totals	351,027,160	1,047,842	440	14	0	980,520	2,142½	6.23

Average amount of Coal consumed per day, 1 ton 6 cwt. 1 qr.

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DELAWARE WORKS.

At these Works the power is supplied by two steam engines. One is a high pressure engine, driving a double acting pump eighteen inches in diameter, six feet stroke; the other is a low pressure engine, driving a double acting pump nineteen inches in diameter, six feet stroke. Both engines have been recently overhauled and are in good order. The pumps require essential repairs, each one having a defective valve-box. These cannot be repaired so as to be reliable for hard service, and should be wholly renewed. Otherwise, the pumping machinery is in effective condition.

Originally there were six cylinder boilers erected for the high pressure engine, which were altered during the time of my predecessor. These boilers were used for both the high and low pressure engines, and at times were used to run them both together, which could not be done to advantage, as when the steam was at a proper pressure for the high pressure engine, it was too high for the condensing engine, and it was extremely difficult to regulate steam so as to run both engines at the same time. After the change in the cylinder boilers, the tubular boiler was set back at a distance of 40 feet from the chimney, and a culvert constructed under the house for draught. This, from the dampness incident to the location, failed to be effective. To remedy the defect, I have had an iron flue extended from the boiler to the chimney, and yet with all the disadvantage of remoteness from the chimney, and the want of protecting walls to prevent the radiation of heat, the tubular boiler proves to be more economical in coal than the others. By putting the tubular boiler in effective working order, the further advantage is secured of having independent boilers for each engine, which brings all the machinery under better control.

It will be remembered by Councils, that in July last, it became necessary on account of the impure character of the water supplied from the Delaware Works, to make a thorough examination of the basin and the water in the vicinity of the pumps. In the course of the investigation, I deemed it proper to have a quantity of the water taken from the basin, submitted to Professor Booth for analysis, his opinion of which is contained in the following note:

Philadelphia, July 29, 1856.

DEAR SIR:—The water from the Kensington Water Works, abounding with scum and sediment is so foul from putrifying organic matter, apparently of animal origin, that a chemical examination of it would be useless. I would not be willing personally to use the water from which the sample was drawn, nor even water which had a remote connection with it, believing it to be injurious to health.

Yours respectfully,

JAS. C. BOOTH.

To SAMUEL OGDIN, Esq., Superintendent of Water Works.

The causes of this foul condition of the water were found in part, in the fact that the dock on the north line of the Works had been used as a depot for cleaning fish, for several years, and a large quantity of decomposed fish offal had accumulated on the bottom. The trunk through which the water is drawn from the river being of planks and very leaky, and at one point exposed to the foul water of this dock, gave it a ready admission, and thus it found its way to the basin. To remedy the evil, the water was drawn off from the basins, which were thoroughly cleansed—the wooden trunk was repaired, and the dock was cleaned out by order of the Board of Health. From that time there has been less complaint of the quality of the water.

It is my duty, however, to say that there are other causes of

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impurity in the Delaware water at the point where the works are situated, that cannot be so readily removed. They are located in a bend of the river where an eddy is formed, and the filthy water from Gunner's Run and from the City drainage into the docks, instead of being carried away by the tide currents, remains in the eddy and is drawn into the pumps. This must in course of time again place the basins in the condition in which they were found in July last. In another part of this communication, the entire abandonment of these Works is suggested for other reasons, and the facts above referred to, affecting the character of the water, give the recommendation additional force.

The basins and grounds of the Delaware Works are now in good order.

Should the Delaware Works be continued as a source of supply for the north-eastern Wards of the City, the increased consumption will make it necessary for another ascending main. There is now but one, and that is but eighteen inches in diameter, and obstructed by three angles. It has also the draw-back of being 12,000 feet in length. This creates a heavy and unprofitable load for the engines.

During a part of the past year it became necessary to run both engines at once, and experiments made at the time to test the pressure on the main, gave the following results: when both engines were standing, the pressure was fifty pounds per inch; when one engine was running at twelve revolutions, the pressure was sixty-three pounds; and when both were running, making together twenty revolutions per minute, the pressure was eighty-seven pounds.

This amount of pressure endangers both the main and the machinery, and besides consumes almost double the fuel that would be required to raise the same quantity of water if there was a sufficiency of main, thus making it at present inexpedient and hazardous to run the two engines at one time.

In averaging the work done by these engines during the year, I find they raise 22,349 wine gallons 112 feet high, with 100 lbs. of best *Lehigh* coal, while at the Schuylkill Works, engines not any better adapted to economise coal, raise 29,557 gallons 115 feet high, with 100 lbs. of *Schuylkill* coal. The difference against the engines at the Delaware Works, is chiefly chargeable upon the great length of the ascending main.

The Reservoirs connected with the Delaware Works furnish a storage equal to 11,333,747 wine gallons.

A table exhibiting the amount of water furnished by the Delaware Works during the year 1856, is appended.

Account of the Consumption of Water and the Operation of the DELAWARE WORKS, *during the year* 1856, *being for the Supply of the* 16*th*, 17*th*, 18*th*, 19*th and part of* 23*d Wards of the City.*

ENGINES NOS. 1 AND 2.

MONTHS.	Total quantity of Water pumped during the year.	Average amount of Water pumped per day.	Total amount of Coal consumed during the year.			Amount of Coal used per day, when engines run.			Number of hours the engines run.	Average number of hours engines run per day.
	Wine Gallons.	*Wine Gallons.*	*Tons.*	*Cwt.*	*qrs.*	*Tons.*	*Cwt.*	*qrs.*		
January	63,817,380	2,058,625	98	13	2	3	3	2	579	18.40
February	47,284,380	1,630,495	75	9	0	2	12	0	429	14.47
March	47,780,370	1,541,302	97	7	0	3	2	3	433½	13.59
April	53,677,140	1,789,238	109	7	0	3	12	3	487	16.14
May	68,226,180	2,200,844	127	2	0	4	2	0	619	19.58
June	68,115,960	2,270,532	118	6	0	3	18	3	618	20.36
July	58,637,040	2,792,240	118	17	0	5	13	0	532	25.20
August	81,728,130	2,636,391	180	0	0	5	16	0	741½	23.55
September	70,430,580	2,347,686	181	1	0	6	0	2	639	21.18
October	79,358,400	2,559,948	176	11	0	5	13	3	720	23.13
November	68,556,840	2,285,228	124	3	0	4	2	3	622	20.44
December	61,953,640	1,998,504	127	0	0	4	0	1	562	18.07
Totals	769,566,040	2,102,639	1,533	16	2	4	4	0	6,982	19.04

Average amount of Coal consumed per day, 4 tons 4 cwt.

The engines in July were both stopped for ten days, for repairs to Kensington basin.

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TWENTY-FOURTH WARD WORKS.

These Works are situated on the west bank of the Schuylkill, above the Fairmount Dam, and are designed to supply that part of the City lying west of the river. The power is supplied by two direct acting Cornish Bull Engines, both made from the same patterns. The steam cylinders are fifty inches in diameter, with eight feet stroke; the pumps are seventeen inches in diameter, and eight feet stroke; the steam pistons and plungers being in the same vertical line and moving together. Each engine has a gang of two Cornish boilers.

The Twenty-fourth Ward Works were erected by contract, and accepted by my predecessor. A condition of the contract required the contractors to run the engines and maintain the Works one year at their own expense. This period having terminated on the first day of September last, the Works were delivered over to my charge. The machinery was found to be very defective in many parts, and worked roughly. Since then, however, it has been much improved, and other alterations are still to be made. Taking into consideration the circumstances that these engines have to be kept constantly fired up, and that they have to be started and stopped about twice in every hour, which places them at great disadvantage, they are now doing a very satisfactory duty.

For storage and head for the Works in the Twenty-fourth Ward, there is a stand-pipe one hundred and thirty feet high, and five feet in diameter, situated on an elevated piece of ground at a distance of eighteen hundred and twenty feet from the engines. The distributing main is extended up in the stand-pipe one hundred feet, leaving but thirty feet for storage. This I con-

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sider altogether wrong. The *pumping main* should have been carried up in the stand-pipe, and not the *distributing main.* By this plan there would have been a much greater amount of storage, and the same even load would still have been placed upon the engines.

As at present constructed, the whole amount of storage subject to be drawn off through the distributing main, is less than five thousand gallons. Had the mains been constructed as before mentioned, the grounds on which the stand-pipe is erected being high, the consumers might have had the benefit of a good head with but sixty feet of water in the stand-pipe. These Works should have a Reservoir which could be supplied from the stand-pipe, and I recommend to Councils to take some action toward securing a proper site, as one can be had on better terms at present, than when the few places suitable for such a purpose become improved. With a Reservoir, the ordinary expenses of the Works could be very much reduced, as a steady supply could then be kept up without running the engines at night. This would dispense with one set of hands, and reduce the amount of coal consumed. There would in my judgment be another good result following such an improvement. The citizens in the vicinity supplied by these Works, have not sufficient confidence in the storage as furnished by the stand-pipe, to induce them to abandon their pumps. Such confidence would be inspired by the construction of a Reservoir, and the water duplicate of the Ward would soon show a gratifying increase.

The foundation of the stand-pipe is exposed, and is not only subject to injury thereby, but the unsightly walls detract very much from the general beauty of the structure. To carry out the original design, the earth around the base of the pipe should be raised about five feet, with a gradual fall to the level of the surrounding grounds. It should also be sodded. Some mason-work will be required, as there should be steps to the door of

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entrance to the stairway. These improvements can all be made at a small cost, and will greatly enhance the beauty of the grounds.

It is necessary for the engineer at the Twenty-fourth Ward Works to know when there is a fire in the Ward, for if he does not, the supply of water would soon fall short; but on account of their distance from the built up portion of the Ward, and being situated on very low grounds, the engineer is without any means of knowing when a fire occurs. To obviate this, I recommend the extension of telegraph wires from the Ward station-house to the Works, so that the engineer may be enabled to keep up a full supply during the continuance of the fire. There can be no doubt that a far more eligible site for these Works could have been selected, but as they are already constructed, and there is a very little probability that they will be abandoned, I deem it unnecessary to go into any extended remarks upon the subject.

The roofs of the boiler-houses (which are of slate and iron frames, and very defective in workmanship and materials,) are in very bad condition.

Some improvement has been made to the coal shutes. They were formerly about three feet above the floor of the boiler-house, and on that account very inconvenient. They are now graded to the same level.

The following table shows the amount of duty performed by the Twenty-fourth Ward Works during the year 1856.

Account of the Consumption of Water, and the Operation of the TWENTY-FOURTH WARD STEAM WORKS, *during the year* 1856, *being for the Supply of the* 24*th Ward of the City.*

ENGINES NOS. 1 AND 2.

MONTHS.	Total quantity of Water pumped during the year.	Average amount of Water pumped per day.	Total amount of Coal consumed during the year.	Average of Coal used per day.	Average No. of strokes engines made per day.
	Wine Gallons.	*Wine Gallons.*	*lbs.*	*lbs.*	
January	3,594,420	115,949	31,350	1,012	1,288
February	3,854,520	132,914	25,300	872	1,476
March	3,550,410	114,529	29,004	936	1,272
April	3,414,420	113,814	24,225	808	1,264
May	4,071,062	131,324	24,650	795	1,459
June	4,418,100	147,270	26,450	881	1,636
July	5,521,860	178,124	33,000	1,065	1,979
August	4,341,690	140,054	33,150	1,069	1,556
September	3,850,650	128,355	31,970	1,066	1,426
October	5,568,930	179,642	35,840	1,156	1,996
November	4,851,900	161,730	40,820	1,344	1,797
December	5,539,680	178,699	34,100	1,100	1,985
Totals	52,577,642	143,654	369,859	1,010	1,600

Average amount of Coal consumed per day, 1,010 pounds.

Total Amount of Water pumped by all the Works, excepting the Twenty-fourth Ward.

RECAPITULATION.

MONTHS.	Total quantity of water pumped each month during the year.	Average amount of water pumped per day during the year.	Average Temperature of the Month at Noon.
	Wine Gallons.	*Wine Gallons.*	*Fahrenheit.*
January	330,837,824	10,672,187	28.3
February	305,018,069	10,517,864	32.7
March	328,543,187	10,598,167	40
April	397,794,460	13,259,815	62.3
May	462,267,711	14,911,861	67
June	553,330,455	18,444,348	82.9
July	668,552,488	21,566,209	87.9
August	591,225,090	19,071,777	79.1
September	575,047,342	19,168,244	73.8
October	564,014,278	18,194,008	60.9
November	483,153,462	16,105,115	51.5
December	423,576,958	11,532,520	36.9
Totals	5,683,361,324	15,528,309	58.6

The following Table exhibits the average Monthly fall of Rain during the last nineteen years.

MONTHS.	INCHES.	MONTHS.	INCHES.
January	3.09	July	4.14
February	2.93	August	4.67
March	3.43	September	3.52
April	3.60	October	3.18
May	3.89	November	3.35
June	3.57	December	4.03

The greatest fall of rain during any one month, was 11.80 inches, in July, 1842. The least was a ¼ of an inch, in September, 1846. The average yearly rain fall for these 19 years, was 43.62 inches. The greatest yearly rain fall, 52½ inches, was in 1841, and the least in 1856. The above information was politely furnished by John Conrad, M. D., of the Pennsylvania Hospital. The average temperature of the month was received through the politeness of McAllister & Brother, No. 194 Chestnut street.

In July, 1856, the demands upon all the Works east of the Schuylkill were very heavy, and a comparison of the daily consumption during that month with the maximum daily capacity of the Works, and the increase of daily consumption in July, 1856, over July, 1855, presents some interesting and important subjects for consideration.

	Wine Gallons.	Wine Gallons.	Wine Gallons.
The maximum daily capacity of the Fairmount Works, working nine wheels, 18 hours, is	12,727,708		
The average daily consumption from Works in July, 1856, was	11,445,891		
Leaving a daily excess of		1,281,817	
The increase of daily consumption in July, 1856, over July, 1855, was			2,032,674
The maximum daily capacity of the Schuylkill Works, working 24 hours, is	12,418,560		
The average daily consumption in July, 1856, by that part of the city supplied from the Schuylkill Works, was	7,328,077		
Leaving a daily excess of		5,090,483	
The increase of daily consumption in July, 1856, over July, 1855, was			1,612,388
The maximum daily capacity of the Delaware Works, with but one ascending main, is placed at what was done in July, 1856, as any greater duty would endanger both machinery and main. This was	2,792,240		
The average daily consumption in July, 1856, by that part of the city supplied by the Delaware Works, was	2,792,240		
The increase of daily consumption in July, 1856, over July, 1855, was			1,026,135
Total daily excess of capacity over consumption in July, 1856, was		6,372,300	
Total increase of daily consumption in July, 1856, over July, 1855, was			4,671,197

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The most cursory examination of the foregoing table, will not fail to draw attention to the fact, that the Delaware Works as at present constructed, must soon fail to supply that part of the City to which they are now and were originally devoted. If they are still to supply that section, and the consumption continues to increase in the ratio of the last year, both engines will have to be worked at the same time; and this cannot be done without an additional ascending main. There will be required also a new distributing main, as at many points there is now a short supply. As the ascending main of the Delaware Works is 12,000 feet long, and the distributing main not much less, it will at once be seen that these additions will involve a heavy expense. This, however, is but one of the means that may be adopted to ensure a better supply to that part of the city. There is another, in my judgment, that is much preferable, because it not only answers the immediate purpose as well, but has several collateral advantages for present and future uses, and will not prove more expensive. A connecting main of large capacity may be laid from the Reservoirs of the Schuylkill Works to the Reservoirs of the Delaware Works, on the high ground between the two points. The advantages of this plan are numerous:

First—It gives to the citizens supplied from the Kensington basins, a supply of pure Schuylkill water, instead of that which experience has shown to be subject to contaminations, and prejudicial to health.

Second—It will furnish with a good head of water, the high portions of the Nineteenth and Twentieth Wards, which are now virtually deprived of a supply. The distance from basin to basin is 16,000 feet. I have had the heights taken between the two Reservoirs, and find that this arrangement will give a head of fourteen feet above the highest curb in either of the Wards above mentioned.

Third—This plan looks to the entire abandonment of the Dela-

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ware Works, because their operation through a long main is more expensive than the plan now presented—because they are unequal to the service they have to perform—and because the water is impure. It should be remarked, also, that in this view, the present ascending main of the Delaware Works can be used to advantage as a distributing main, and thus avoid the expense of another.

By reference to the preceding table, it will be seen also, that another year of increased consumption in the ratio of the past, will overreach the powers of the Fairmount Works in the month of July. This leads to the consideration of the subject of additional Works. The present embarrassed state of the finances of the City, caused me to question the propriety of recommending any matters involving heavy expense; but as the construction of additional Water Works is a subject involving the convenience, comfort and health of the people of the City, and is, moreover, one that cannot be considered too early; it rises superior to the causes that impel me to omit in this Report. There is no other available source for a supply of pure water to Philadelphia, than the Schuylkill. The limit to a supply by water-power is already reached, as will be seen upon reference to what has been previously said of the Fairmount Works, thirty gallons being used for power to raise one gallon for consumption. Steam power must, therefore, be applied in any addition that may be made to the present Works. In this connection, another consideration presents itself, and that is, the selection of the most eligible site.

The new Works when erected should be so situated, as to be able to supply through the shortest possible main, either the Fairmount, Delaware or Schuylkill basins. Such a location is presented on that part of the Lemon Hill property, known as Lloyd's Canal. No greater length of main than three thousand feet would be required for either of the Reservoirs, if the Schuylkill and Delaware Works are united. The erection of the Water Works at this point would in no way interfere with the contemplated public park embracing the same property, as all the necessary structures could be made in ornamental style. In concluding this subject, I respectfully suggest to Councils, that as this matter is one of grave importance, and from its character will move slowly towards its consummation, it cannot be too soon considered.

That the table showing the great increase in consumption during the last year, may not mislead Councils, it may be said, that a part of the increase is due to the great amount of water then used in cleansing the streets. The police, by authority given by this department to the Mayor, were permitted to use the fire plugs wherever, in their judgment, the public good required; and the exercise of this privilege under direction of the Mayor, had a salutary effect on the condition of the streets, and the public health. Hereafter, this permission must necessarily be abridged.

One source of great waste of water, as well as of annoyance to people walking to and from their places of business, is the water fixtures known as Wash Paves. These are frequently allowed to run for hours at a time, and some of them the greater portion of the day. As a remedy, I suggest a regulation limiting their use to certain hours, in the evening or early in the morning.

The short supply and small head of water in several sections of the city, have engaged my attention in devising a remedy; and as sound policy dictates an increase of the present amount of storage, the subjects have been considered together. The true remedy, is to construct stand-pipes or reservoirs near certain centres of distribution. There are hours of the day when the water is drawn from the mains as fast as their capacity will supply it; then certain localities suffer a deprivation. There are other parts of the day when their capacity is greatly in excess of the draught; and at these times, for a want of storage

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at the proper points, the mains are idle. If they could be kept in operation at such hours, and had places of storage in the immediate vicinity of a deficient distribution, the supply would be very nearly equalized. Reservoirs thus placed, furnish a steady head on the distributing mains, (any unusual draught being quickly felt, and as quick supplied,) and thus prevent the constant fluctuations to which all pipes are subject which draw their supply from a long distance. In this connection, and for the purposes mentioned, I recommend that a Reservoir be located in the south-western part of the city, and that stand-pipes of proper size and ornamental character, be erected in each of the public squares. The remedy thus described can be applied without any material additions to the present distributing mains.

It gives me pleasure to state, that since the department has been in my charge, there has been no accident, nor any occurrence interrupting the successful operation of the Works.

The attention of Councils is respectfully invited to the urgent necessity of providing additional office-room for this Department. The accommodations now furnished are altogether inadequate to its enlarged and constantly increasing business, and it is out of the question to dispose of it as promptly as the officers and clerks desire, and as the citizens have a right to expect.

The total Appropriations for the year 1856, *and the amount of Warrants drawn upon them, are as follows:*

DATE.	Appropriation.	Amount of Appropriation.	Expended.	Balance.
March 11, 1856,	General Appropriation for the year........	$140,800 00	$138,854 85	$1,845 15
" " "	For plugs at Germantown....................	338 75	338 75	
August, "	For repairs to Dam..............................	5,000 00	4,997 42	2 58
	Berkenbine & Trotter, for balance of contract..	16,000 00	16,000 00	
Dec. 20, "	For Damages to George Cubler..............	177 00	177 00	
	Total Appropriations..................	$162,315 75	$160,368 02	$1,847 73

Of the General Appropriation for the year, approved March 11, 1856, *the Expenditures were as follows:*

	Delaware.	Schuylkill.	Fairmount.	Twenty-fourth Ward.	Total.
Power..................	$14,600 16	$28,341 73	$ 6,257 80	$2,296 51	$51,496 20
Iron Pipes............	12,691 41	17,480 47	18,007 65	4,257 71	52,437 24
Distribution..........	2,245 90	3,409 49	6,000 13	626 62	12,282 14
Maintenance.........	1,530 25	2,492 51	2,360 92	558 49	6,942 17
Salaries...............	4,333 65	4,333 65	4,333 65		13,000 95
Incidentals...........	832 00	832 00	832 15	300 00	2,796 15
	$36,233 37	$56,889 85	$37,792 30	$8,039 33	$138,954 85

The following Amounts have been received by the Chief Engineer.

1856.			*Dolls.*	*C.*
February	16,	Rent of lot south of Reservoir	12	50
"	"	Rent of lot north of Reservoir,	15	00
"	"	Rent of dwelling at Resorvoir,	7	00
"	"	Six months' rent of wharf at Fairmount,	100	00
"	"	For shifting plug for Reading railroad,	24	57
April	10,	For price of old leather,	6	00
"	"	Rent of lot north of Reservoir,	15	00
"	"	Rent of lot south of Reservoir,	12	50
"	26,	For use of party wall in Cherry Street,	93	63
May	31,	Rent of wharf at Kensington,	50	00
July	2,	Rent of wharf at Fairmount,	100	00
"	5,	Rent of lot north of Reservoir,	15	00
"	16,	Rent of lot south of Reservoir,	12	50
"	23,	Shifting plug in George Street,	7	91
October	1,	Rent of lot south of Reservoir,	12	50
"	"	Rent of lot north of Reservoir,	15	00
December	"	For scrap iron,	370	00
"	"	For old brass,	91	00
			960	11

Account of Iron Pipes laid in 1856, *in the First, Second, Third and Fourth Wards.*

STREETS.	LOCATION.	SIZE.	FEET.	FEET.	FEET.
		INCH			
Pritchett,	West of Thirteenth street.............	3	362		
Anita,	West of Twelfth............................	“	333		
Dorrance,	From Carpenter to Prime..............	“	410		
Ward,	From Carpenter to Prime..............	“	410		
Bedford,	From Nineteenth to Twentieth........	“	460		
Holly,	From Fitzwater to Catharine..........	“	355		
	Attachments to Fire Plugs............	“	64		
				2394	
Clymer,	From Sixth to Campbell...............	4	170		
Lewis,	From Sixth to Seventh..................	“	459		
Dickerson,	From Sixth to Seventh..................	“	445		
Brinton,	East from Eighth.........................	“	225		
	Attachments to Fire Plugs......	“	251		
				1550	
Fifth,	From Mifflin to Snyder..................	6	878		
Franklin,	From Front to Jefferson Avenue......	“	1014		
Franklin,	From Eighth to Ninth....................	“	426		
Eighteenth,	From Shippen to Prime..................	“	1785		
Carpenter,	From Eighteenth to Nineteenth......	“	435		
Nineteenth,	From South to Shippen........	“	320		
Shippen,	From Nineteenth to Twentieth........	“	512		
Fitzwater,	From Seventeenth to Nineteenth.....	“	675		
Seventeenth,	From Fitzwater to Catharine..........	“	350		
Sutherland Av	South of Naval Asylum................	“	225		
Passyunk Rd.	Below Tenth to Broad, on Broad to Snyder, east side.......................	“	3775		
Fifteenth,	From Carpenter to Christian..........	“	370		
Franklin,	From Eighth to Beulah..................	“	285		
	Attachments to Fire Plugs............	“	30		
				11080	
					15024

Iron Pipes laid in the Fifth, Sixth, Seventh, Eighth, Ninth and Tenth Wards.

STREETS.	LOCATION.	SIZE.	FEET.	FEET.	FEET.
		INCH			
Meredith,	From Beach to Bank streets	3	730		
Bradford,	West of Seventh	"	310		
	Letitia	"	261		
	Attachments to Fire Plugs		21		
				1,322	
Broad,	From Pine to South	6	710		
Pine,	From Twenty-second to Twenty-third	"	315		
Cherry,	East of Twenty-first	"	272		
Broad,	From Spruce to Locust	"	450		
				1,747	
	Attachments to Fire Plugs	4		33	
					3,102

Iron Pipes laid in the Eleventh, Twelfth, Sixteenth, Seventeenth, Eighteenth and Nineteenth Wards.

STREETS.	LOCATION.	SIZE.	FEET.	FEET.	FEET.
		INCH			
Parker,	From Adam to Cumberland streets	4	398		
Gold,	From Brown to Duke	"	232		
Washington,	From Master to Jefferson	"	445		
	Attachments to Fire Plugs	"	142		
				1,217	
Lemon,	From Wood to York	6	774		
Adam,	From Frankford Road to Parker	"	222		
Maple,	From Richmond to Brown	"	487		
Brown,	From Gold to Maple	"	235		
Coral,	From Cumberland to Adams	"	386		
Delaware Av.,	From Callowhill to Poplar	"	1865		
Fifth,	From Diamond to Wood	"	612		
Fifth,	From Norris to Wager	"	429		
Amber,	From Wood to York	"	807		
Emerald,	From Huntington to Lehigh Avenue	"	648		
Somerset,	From West to William	"	585		
Brown,	From Somerset to William	"	602		
Amber,	From Norris to Wood	"	751		
Clinton,	West of Somerset	"	582		
Fifth,	From Buttonwood to Old York Road	"	303		
				9,288	
					10505

Iron Pipes laid in the Thirteenth, Fourteenth, Fifteenth and Twentieth Wards.

STREETS.	LOCATION.	SIZE.	FEET.	FEET.	FEET.
Pleasant,	From Tenth street to Ridge Avenue.	4	424		
Swain,	From Fifteenth to Sixteenth...........	"	448		
Lex,	From Fifteenth to Sixteenth...........	"	440		
	Attachments to Fire Plugs............	"	299		
Girard Av.,	From Sixth to Tenth, both sides......	"	2754		
Thompson,	From Twelfth to Thirteenth............	"	903		
Sixth,	From Montgomery to Girard Avenue	"	1717		
Clinton,	From Girard Avenue to Thompson...	"	507		
Margaretta,	From Girard Avenue to Poplar........	"	621		
Centre,	From Twenty-first to Twenty-second	"	436		
Virginia,	From Twenty-second to Twenty-third	"	373		
Lewis,	From Thompson to Master............	"	469		
	Attachments to Fire Plugs............	"	294		
				9685	
Vineyard,	From Nineteenth to Ridge Avenue...	6	764		
Poplar,	From Twentieth to Twenty-first......	"	325		
Mervine,	From Oxford to Columbia..............	"	511		
Oxford,	From Mervine to Twelfth..............	"	231		
Oxford,	From Twelfth to Thirteenth...........	"	452		
Franklin,	North of Jefferson.......................	"	95		
Marshall,	North of Jefferson.......................	"	166		
Ann,	From Ridge Avenue to Nineteenth .	"	1131		
Washington,	From Fifteenth to Sixteenth..........	"	448		
Ridge Av.,	From Poplar to Girard Avenue.......	"	665		
Girard Av.,	From Ridge Avenue to Corinthian...	"	1065		
Franklin,	From Girard Avenue to Thompson...	"	529		
Twenty-first,	From Spring Garden to Coates........	"	1224		
Poplar,	From Nineteenth to Twentieth........	"	423		
Sixteenth,	From Coates to Ridge Avenue.........	"	527		
Fifteenth,	From Coates to Ridge Avenue.........	"	282		
Twentieth,	From Brown to Parrish..................	"	395		
Wood,	From Sixth to Eighth.....................	"	1000		
Twenty-third,	From Green to Spring Garden.........	"	457		
Clinton,	From Putnam to Montgomery.........	"	194		
	Attachment on Green.....................	"	9		
	Attachment on Vineyard and Ridge Avenue..................................	"	34		
				10927	
	Connections at Cohocksink Bridge...	10	24		
	Connections at Ann and Powell......	"	18		
	Connections at Girard and Nineteenth..................................	"	20		
				62	
					20674

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Iron Pipes laid in Twenty-fourth Ward.

STREETS.	LOCATION.	SIZE.	FEET.	FEET.	FEET.
		INCH			
Baring,	From Thirty-fifth to Thirty-sixth st..	4	385		
	Attachments to Fire Plugs............		115		
				500	
Mansion,	From Chestnut to Oak..................	6	268		
Oak,	From Mansion to Bridgewater	"	1081		
Bridgewater,	From Oak to Market....................	"	296		
Eagle,	From Lexington to Oneida.............	"	938		
Lexington,	From Huron to Haverford Road......	"	1138		
Chestnut Av.,	From Walnut to Church...............	"	723		
				4,444	
Chestnut, "	From Woodland to Mansion...........	8	630		
				630	
					5,574

RECAPITULATION.

WARDS.	3 inch diameter.	4 inch diameter.	6 inch diameter.	8 inch diameter.	10 in. diameter.	Total.
First, Second, Third and Fourth.....	2,394	1,550	1,0 80			15,024
Fifth, Sixth, Seventh, Eighth, Ninth and Tenth..............................	1,322	33	1,747			3,102
Thirteenth, Fourteenth, Fifteenth and Twentieth........................		9,685	10,927		62	20,674
Eleventh, Twelfth, Sixteenth, Seventeenth, Eighteenth, Nineteenth and Twenty-third...........		1,217	9,288			10,505
Twenty-fourth		500	4,444	630		5,574
	3,716	12,985	37,486	630	62	54,879

Being a total of 99 feet more than $10\frac{3}{8}$ miles.

DISTRIBUTION.

It will be seen by reference to the tables, that the aggregate of iron distributing pipes laid in 1856, is something over ten and three-eighths miles. A large amount ordered by Councils has not yet been laid, because of the want of an appropriation. This has subjected many citizens and owners of property to much inconvenience. It has not only deprived them of the advantages of a supply of water, but has delayed the paving of the streets, many ordinances requiring that paving shall not be done until the water-pipes are laid. It has also prevented the renting of recently improved property, as houses without hydrants are not desirable. If the laying of distributing pipes involved an unprofitable expense to the city, a policy having such results would be more readily understood. But such is not the case. Almost every dollar expended for water-pipes, is repaid into the treasury. I have the authority of the City Solicitor for the statement, that it is a rare thing to lose a pipe claim, the reason being that no water can be introduced into the premises of a pipe delinquent, without the pipe bill being first paid. Not only is the first expense repaid to the Treasury, but every additional street furnished with distributing mains, adds to the revenue of the city, without increasing its debt or its invested capital. It seems to me, therefore, to be the clear policy of the city, to lay distributing pipes wherever there is a demand for them. I respectfully present this view for the consideration of Councils.

Since July last, there has been in progress a careful examination of the distribution over all the city. This has led to the correction of many defects, and has yielded the Department valuable information on many subjects not to be found upon its records. One of the first results of this investigation, was the detection of the causes of the frequent leaks in some sections of the city. As a general fact, it has been found that the iron pipes laid by contract, are jointed chiefly with hemp gasketing, with very little lead ; in some cases the lead being scarcely half an inch in thickness. When the hemp becomes rotten, the joints are no longer able to resist the pressure, and leaks are the inevitable results. In the course of the examination referred to, it was discovered that in some places the stops were permanently shut down, which destroyed the circulation—that in other cases, the boxes had been filled in, leaving no marks by which they could be found—that in some sections, the stops were so far distant from each other, that neither attachments nor repairs could be made without loss of time and inconvenience to large neighborhoods, and that many were so defective as to be of no use. Wherever discoveries have been made of the character referred to, the proper remedies have been applied without delay. New stops have been put in, and those capable of repairs have been put in serviceable condition. The fire-plugs have been examined with a care due to their importance, and every thing has been done to place them in good order, and to protect them from the frost during the winter months.

The absence of any uniform system of laying and locating pipes, prior to consolidation, the many boundary lines dividing the old districts, and their conflicting interests and policy, have led to many evils in the distribution. In some places, the pipe terminate abruptly at the old dividing lines, causing what are called Dead Ends, and preventing circulation; in others, the pipes decrease in capacity, where their capacity should have been increased. For the latter class of evils there has not been provided any efficient remedy. The obstructed circulation from dead ends, has been corrected either by putting in branches, or with connections by lead pipes and ferrules.

In the Twenty-fourth Ward, there seems to have been no system whatever in regulating the depth at which the pipes were laid. Several of the streets there having been graded since the pipes were laid, some were left exposed on the surface of the ground, and had to be relaid; others are at various depths, from eighteen inches to thirteen feet.

To provide as far as possible against the recurrence of the several faults which have been referred to, I am preparing a plan of the distribution of the whole city, on which will be marked the stops, plugs, branches, and other fixtures—the size of the pipe—and wherever it can be ascertained, the date when the pipes were laid. The plan is completed for that part of the city below South street. Here the execution of it has been very difficult, as the records were few and imperfect. The plan is upon a scale of one inch to one hundred feet, quite large enough to embrace all the necessary details, and yet not so large as to be inconvenient. When completed, the plan will supply a record for reference; the want of which must have been a great disadvantage to the Department.

The hands at the Cherry street shop are employed in fitting up and repairing stops, plugs, and other fixtures for the coming season. In consequence of the limited size of the work-shop, and the want of proper machinery and tools, all the work has to be done by hand power; and there is danger on this account that the supply of fixtures will fail. In this connection, it may be remarked, that the present shop and yard are totally inadequate to the wants of the Department; and that the city carpenter shop, which would furnish sufficient accommodation, is unoccupied. The building there is well adapted to the uses of the Department, having room for storage of the patterns of the machinery for the several works; and the yard would furnish a safe and convenient depot for materials and pipes.

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REVENUE OF THE DEPARTMENT.

For the particulars of the revenue and collections made by the Department, and other matters touching the prompt discharge of the business duties of the Registers Office, I refer you to the report of Wm. V. M'Kean, which I transmit to Councils. This officer has been untiring in his exertions to promote the efficiency of his department. The multifarious business over which he presides, his prompt decisions on the many harrassing questions which continually arise, prove that he is eminently qualified for the position he has assumed.

Respectfully yours,

SAMUEL OGDIN,
Chief Engineer of Water Department.

APPENDIX

TO THE

REPORT OF CHIEF ENGINEER.

Supply of water for the high portion of Fifteenth Ward.

PHILADELPHIA, Oct. 9, 1856.

To the Chairman and Members of the Watering Committee of the Select and Common Councils of Philadelphia.

GENTLEMEN:—My attention has been called by resolution of Council to the inadequate supply of water on the high portion of the Fifteenth Ward. I have examined the matter, and find that there is a supply late at night and in cool weather, which makes it evident to me that the want of a supply is owing to the want of sufficient mains; for when the lower portion of that section is drawing water, it diverts the head of water from the higher parts.

The thirty inch main on Poplar street has at this time attachments, added together, of about one-third its capacity. To remedy the above grievance, I would recommend a pipe ten inches in diameter to be laid in Twenty-second street from Poplar to Green street, about 2200 feet in length, to connect with the present pipes at Green and other streets, put in stops on the line of Seventeenth street on the east, Spring Garden on the south, Twenty-fourth street on the west, Wallace street on the north, with a small pipe leading round the stops to keep the circulation of water.

This will give the lower parts a better supply, and the higher parts bounded as above will have a full supply from the ten inch pipe, except the pipe leading round the stops, which is only to get clear of dead ends; and should any accident occur to any of the service pipes, the stops can be opened to give a supply until repairs can be made. This improvement will not cost over $5,000.

Yours, &c.,

SAMUEL OGDIN,

Chief Engineer of Water Department.

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REPORT

OF THE

Register of the Water Department,

TO

CHIEF ENGINEER.

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Water Department, Register's Office,
January 14th, 1857.

Samuel Ogdin, Esq., *Chief Engineer.*

Sir :—The tabular statements inclosed herewith, will present to you a full Report of the financial operations of this office for the year 1856. Nos. 1, 2 and 3, relate to a part of the year commencing August 18th, and ending December 31st, embracing the time since the office was placed in my charge. No. 4 is a copy of a statement communicated to Councils by Mr. McMahan, the former Register, and relates to the part of the year which terminated August 18th. No. 5, is a statement in detail of the revenue to be derived from the Water Duplicates for 1857. No. 6 exhibits the total receipts of the office in 1856.

The amount of Water Rents on the Duplicates for 1856, remaining unpaid on the 31st December, is $9,601 25. Of this sum, not less than fifty per cent. consists of ascertained errors, which have been stricken entirely from the books of the office. The balance, which is somewhat less than five thousand dollars, has been carried to a supplementary Duplicate, called the Delinquent Duplicate, and every effort will be made to collect it both for 1856 and 1857. Whatever is thus collected for the present year, will, of course, go the credit of the Duplicates for 1857, and have the effect to raise them more nearly to the original estimate. It should be observed that none of the parties delinquent in 1856, have been carried into the regular Duplicates for the present year.

On the 18th day of August, 1856, the outstanding balance on the duplicates of 1856, was greater in amount than on the same day in 1855, by more than the whole amount of unpaid rents on the 31st day of December last. This shows that the policy of sending out bills for collection after the 1st of September, instead of proceeding to "cut off" as the ordinance requires, is operating badly. Of course, parties who know that they will be waited on with bills *after* the 1st of September, will not take any great trouble to pay at the office *before* that date. Those who are indulged in this way communicate it to their neighbors, and thus the bad effects of a bad example increase from year to year. It is suggested for your consideration that some action should be had making the provisions of the ordinance mandatory.

The estimated amount of the Duplicates for 1857, transmitted to the City Controller, on the 11th of December last, was - - -	$381,000 00
The actual amount of the Duplicates, as you will perceive by No. 5, is - - - -	376,545 92
Leaving the Duplicates less than the estimate, -	$4,454 08

This deficiency proceeds from the fact already mentioned, that errors equal in amount to the deficiency have since been discovered upon the Duplicates for 1856, and have been deducted from the Duplicates for 1857.

In speaking thus pointedly of the large amount of errors on the books, it is proper to say that I intend no reflection on the former incumbent of this office. I have no doubt they are in a great measure chargeable upon the hurried manner in which the large business of the office is necessarily transacted. The office-room is too limited to introduce the system that larger accommodations would afford, and the clerical force is too small to give the accounts that careful revision which all public transactions should receive.

While revising the records of the office preparatory to making out the Duplicates for this year, the clerks were obliged to perform an amount of labor too excessive to be exacted from any class of men. From the 1st of December until the 15th of that month, the hours of labor were from 9 A. M. to 9 P. M., and from the 15th of December until the 10th of January, the whole force of the office labored from 9 A. M. to 12 o'clock, midnight. It gives me pleasure to bear testimony to the cheerfulness with which they all discharged this heavy duty.

The eleventh section of the Ordinance, approved October 3d, 1854, requires that all Water Rents shall be registered by Wards. Upon taking possession of the office in August, 1856, I found that but little progress had been made in the execution of this duty. The explanation given by my predecessor was, that the current business was so great, that such a work could not be done without additional force. This has proved to be correct, and no recent entries have been made. Since the passage of the Ordinance establishing a new system of numbering the houses, the work has been entirely suspended, as this will compel the office to commence the whole subject anew. If the records are based upon the new system, a large part of the errors proceeding from the present imperfect system will be avoided, and much valuable time saved to the public and the office. It should have been stated, that many of the errors found on the records, arise from the absence of any accurate means of identifying some properties.

Returning to the Ordinance requiring the re-registering of all Water Rents by Wards, it is my duty to state that these new records are almost indispensible; but that they can never be made unless Councils provide clerks for that special service. Besides the all-important consideration of greater accuracy to be secured by new Registers, I have no doubt that discoveries of fraudulent use of water will be made during the preparation of them that will repay the expense four-fold. It is most earnestly recommended to Councils to make some provisions for the execution of the Ordinance, which is now more than two years old.

The system of inspection established by the same Ordinance operates with excellent effect. All the officers employed in this service discharge their duties promptly and faithfully, and save to the City Treasury more than sufficient to pay the salary roll of the Department.

Respectfully,

W. V. M'KEAN, *Register.*

No. 1.

Amount due on Duplicates of 1856, *August* 18th—*Amount collected since that date—and amount due December* 31*st*, 1856.

DUPLICATES.	Amount due on Duplicate August 18th, 1856.	Amount unpaid December 31st, 1856.	Amount collected from August 18, to Dec. 31, 1856.
Southwark	$3,163 50	$607 25	$2,556 25
Moyamensing	2,579 50	788 25	1,791 25
Fifth Ward	2,640 50	614 00	2,026 50
Sixth Ward	3,117 00	735 50	2,381 50
Seventh Ward	2,767 00	661 00	2,106 00
Eighth Ward	2,112 25	482 00	1,630 25
Ninth Ward	2,278 75	773 25	1,505 50
Tenth Ward	2,057 00	669 75	1,387 25
Northern Liberties	3,851 00	461 50	3,389 50
Spring Garden, East	2,329 00	694 00	1,635 00
Spring Garden, West	4,353 25	1,680 50	2,672 75
Kensington	3,917 50	591 50	3,326 00
Richmond	582 00	32 50	549 50
Penn District	2,571 00	642 25	1,928 75
Twenty-fourth Ward	292 00	168 00	124 00
	$38,611 25	$9,601 25	$29,010 00

No. 2.

Fractional Rents, Permits, &c., from August 18th to December 31st, 1856, inclusive.

No. of Permits.		Fractional Rents.	Ferrules.	Repaving.	Repairs.	Declines.	Totals.
243	First to Fourth Wards, inclusive....	$503 14			$35 25	$16 75	$555 14
355	Fifth to Tenth, including permits to vessels..............................	1,438 57	$729 50	$582 50	11 00	59 75	1,509 32
47	Twenty-fourth Ward.................	134 90					1,446 90
612	Eleventh to Fifteenth, inclusive, Twentieth, and part of Sixteenth,	1,593 72	548 00	332 50	51 00	39 75	2,564 97
	Seventeenth to Nineteenth, and balance of Sixteenth..............	631 58	267 50	124 00	6 00	36 25	1,065 33
1,257		$4,301 91	$1,545 00	$1,039 00	$103 25	$152 50	$7,141 66
	Deduct for moneys refunded to parties to whom no service was rendered..............................						14 65
	Total..						$7,127 01

No. 3.

Payments to the City Treasurer in each Month, from August 18th to December 31st, 1856.

	Aunual Water Rents.	Penalties.	Fractional Water Rents.	Iron Pipes.	Delinquents, 1855.	Total each Month.
August 18th to 31st	$ 7,441 95	$1,114 22				$ 8,556 17
September	9,422 25	1,412 68	$2,690 46	$ 4,252 27	$ 7 75	17,785 41
October	4,630 00	680 81	1,238 40	4,716 64	52 71	11,318 56
November	3,786 75	547 76	1,282 25	7,393 89	20 40	13,031 05
December	3,491 50	501 91	1,855 33	5,511 11		11,359 85
December 31st, paid January 1st, 1857	251 50	36 65	68 75	21 37		378 27
Total	$29,023 95	$4,294 03	$7,135 19	$21,895 28	$80 86	$62,429 31

The above Table exhibits the *receipts* of the Office, as well as the payments to the City Treasurer, except that the receipts date one day earlier than the payments.

No. 6.

Total Receipts—1856.

1856.	Annual Water Rents.	Penalties.	Fractional Water Rents.	Iron Pipes.	Delinquents, 1855.	Total.
Receipts from January 1 to August 16	$321,305 83	$2,842 49	$17,144 44	$ 9,510 41	$1,133 32	$351,936 49
Receipts from August 18 to December 31st	29,023 95	4,294 03	7,135 19	21,895 28	80 86	62,429 31
Total	$350,329 78	$7,136 52	$24,279 63	$31,405 69	$1,214 18	$414,365 80

No. 4.

Statement of Duplicates of Water Rents for the year 1856, *and the Receipts from January* 1*st*, 1856, *to August* 16*th, inclusive.*

FAIRMOUNT WATER WORKS.

Wards.	Duplicates.	Amount of Duplicates January 1st, 1856.	Amount collected to August 16th, 1856.	Amount unpaid August 16th, 1856.
1st,	Southwark.............	$ 34,565 67	$ 31,402 17	$ 3,163 50
4th,	Moyamensing.........	20,848 00	18,268 50	2,579 50
5th,	New Market...........	5,888 25	5,354 25	534 00
	Pine.........	4,962 50	4,506 50	456 00
	Dock.....................	5,529 50	4,802 00	727 50
	Walnut...................	5,188 50	4,265 50	923 00
6th,	Chestnut...............	5,542 50	4,686 00	856 50
	High	6,526 00	5,790 00	736 00
	Lower Delaware......	7,427 25	6,687 75	739 50
	Upper Delaware......	7,283 25	6,498 25	785 00
7th,	Seventh Ward........	24,641 75	21,874 75	2,767 00
8th,	Locust..................	12,845 75	11,674 50	1,171 25
	South	9,562 50	8,624 50	938 00
9th,	Middle..................	8,899 00	8,018 75	880 25
	North..................	12,091 25	10,692 75	1,398 50
10th,	South Mulberry......	10,640 00	9,798 25	841 75
	North Mulberry......	14,642 00	13,426 75	1,215 25
		$197,083 67	$176,371 17	$20,712 50

SCHUYLKILL STEAM WORKS.

11th, 12th,	Northern Liberties...	$ 37,666 75	$ 33,815 75	$ 3,851 00
13th, 14th, and	Spring Garden, East	29,222 50	26,896 50	2,326 00
15th,	Spring Garden, West	35,435 25	31,082 00	4,353 25
20th,	Penn District.........	13,669 25	11,098 25	2,571 00
		$115,993 75	$102,892 50	$13,101 25

DELAWARE STEAM WORKS.

16th, 17th, 18th,	Kensington............	$41,735 41	$37,822 91	$3,912 50
19th	Richmond.............	3,568 25	2,986 25	582 00
		$45,303 66	$40,809 16	$4,494 50

WEST PHILADELPHIA STEAM WORKS.

24th,	West Philadelphia...	$1,525 00	$1,233 00	$292 00

No. 4—(Continued.)

WORKS.	January 1st, 1856.	Collected to Aug. 16th.	Unpaid Aug. 16,
Revenue Fairmount Water Works	$197,083 67	$176,371 17	$20,712 50
Revenue Schuylkill Steam Works	115,993 75	102,892 50	13,101 25
Revenue Delaware Steam Works	45,303 66	40,809 16	4,494 50
Revenue Twenty-fourth Ward Steam Works................	1,525 00	1,233 00	292 00
	$359,906 08	$321,305 83	$38,600 25

Receipts from January 1st, 1856, to August 16th, inclusive.

Account annual water rents..	$321,305 83
Account penalty for non-payment in time........................	2,842 49
Account iron pipes..	9,510 41
Account Fractional Water Rents on new permits............	17,144 44
Account Delinquents for 1855....................................	1,133 32
	$351,936 49
Cr.	
By Cash paid City Treasurer to date..........................	$351,936 54

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No. 5.

Water Duplicates of 1857.

Wards.	Duplicates.	Details and amount of Revenue.		
1st, 2d, 3d and 4th,	Southwark and Moyamensing	$35,906 42 22,361 50	$58,267 92	
5th,	City	21,723 50		
6th,		26,806 50		
7th,		25,422 50		
8th,		23,173 25		
9th,		20,898 75		
10th,		26,119 75	144,144 25	
	Revenue of Fairmount Works			$202,412 17
11th, 12th, 16th, in part,	Northern Liberties		38,209 00	
13th, 14th, and 15th,	Spring Garden, East,		29,866 50	
	" " West,		37,442 75	
20th,	Penn		16,859 00	
	Revenue of Schuylkill Works			122,177 25
16th, in part, 17th, 18th,	Kensington		45,291 00	
19th, and part of 23d,	Richmond		4,419 00	
	Revenue of Delaware Works			49,710 00
24th,	West Philadelphia		2,246 50	
	Revenue of Twenty-fourth Ward Works			2,246 50
	Total Revenue for 1857			$376,545 92

W. V. M'KEAN,

Register.